Mechanical drawings

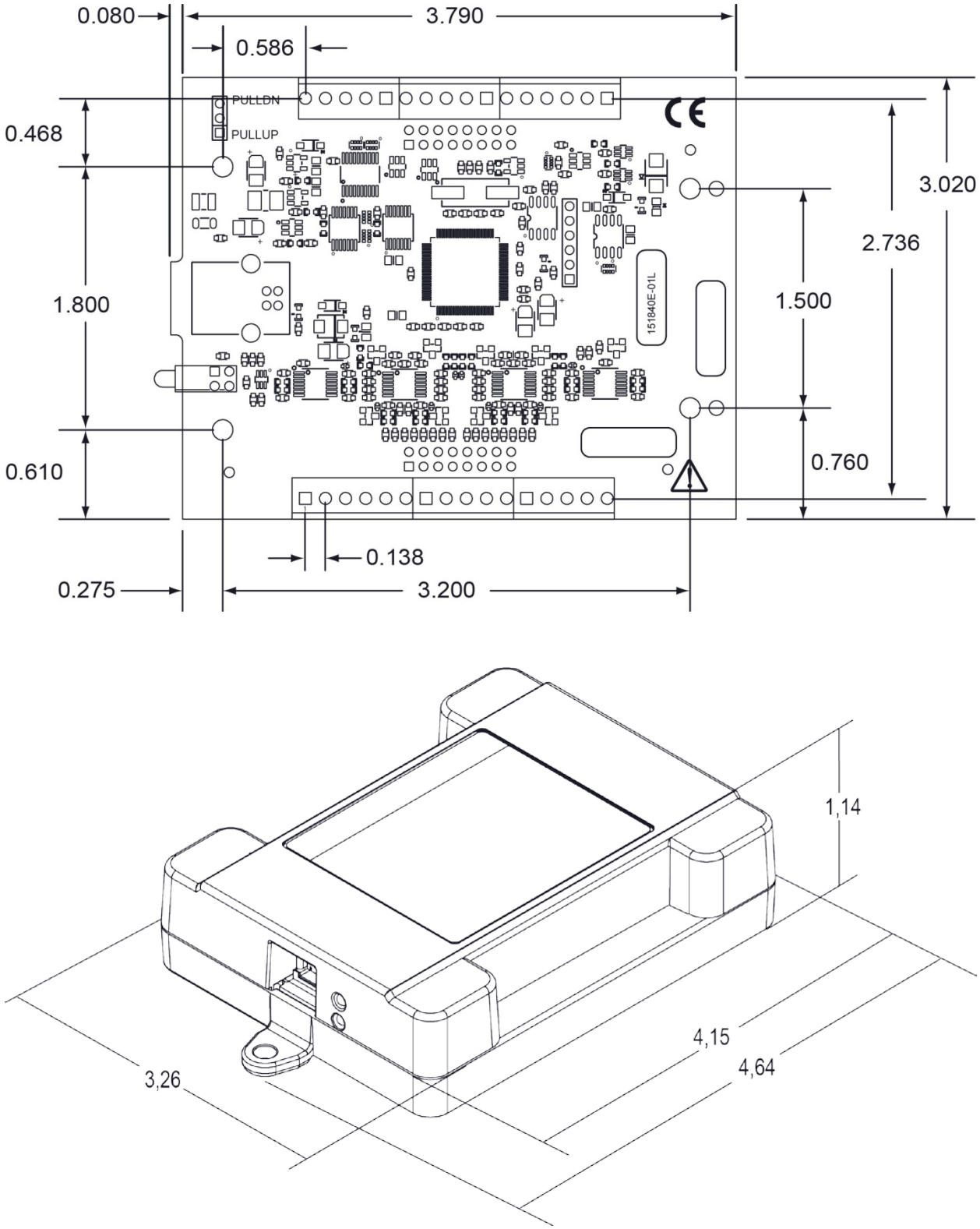

Figure 7. Circuit board (top) and housing dimensions

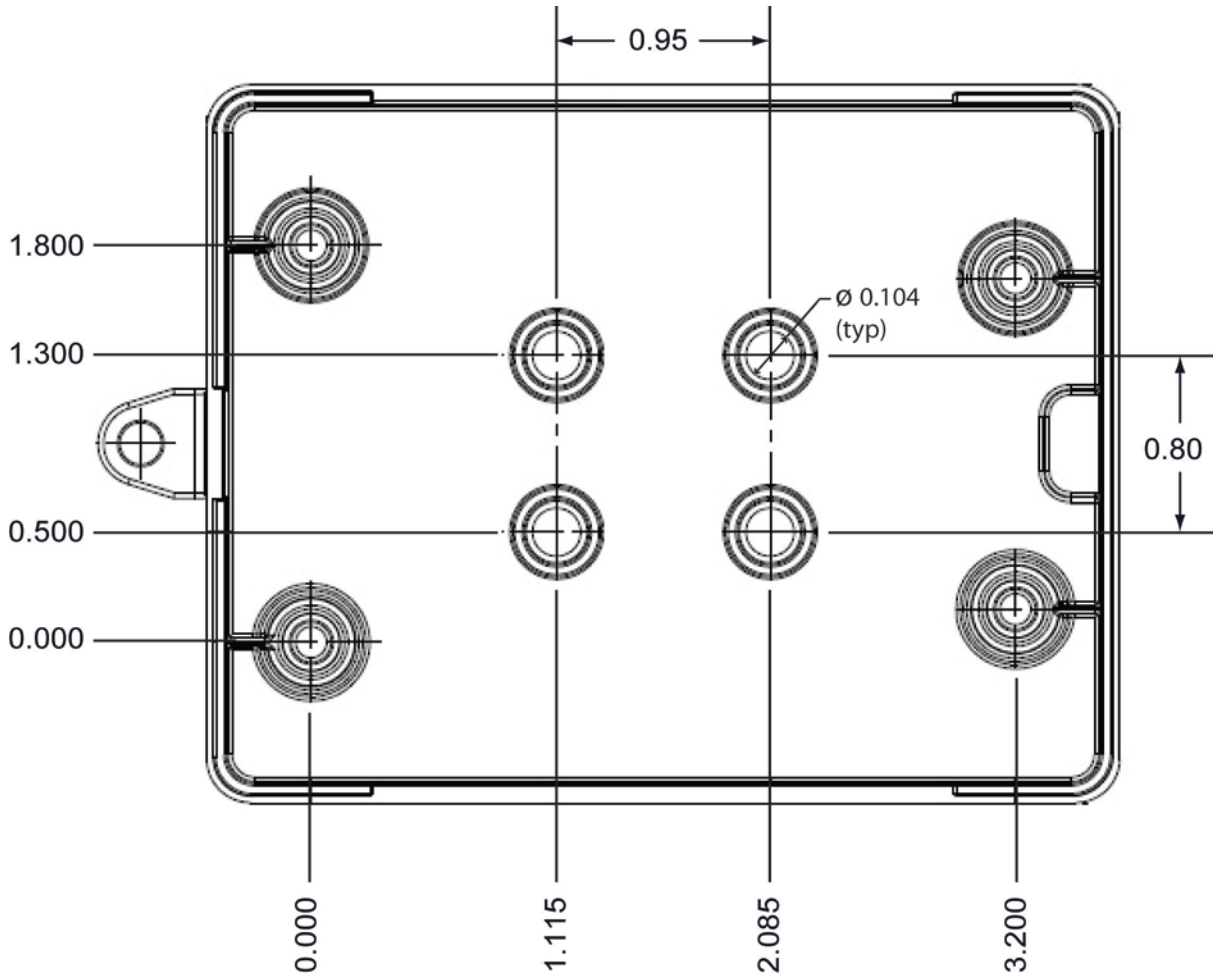

Figure 8. Housing bottom dimensions

Specifications

All specifications are subject to change without notice.
Typical for 25 °C unless otherwise specified.
Specifications in *italic* text are guaranteed by design.

Analog input

Table 1. General analog input specifications

Parameter	Conditions	Specification
A/D converter type		Successive approximation
ADC resolution		12 bits
Number of channels		8 single-ended
Input voltage range		±10 V
Absolute maximum input voltage	*CHx relative to AGND*	▪ *±25 V max (power on)* ▪ *±25 V max (power off)*
Input impedance		▪ *1 MΩ (power on)* ▪ *1 MΩ (power off)*
Input bias current	*10 V input*	*–12 µA*
	0 V input	*2 µA*
	–10 V input	*12 µA*
Input bandwidth	Small signal (–3 dB)	150 kHz
Maximum working voltage	Input range relative to AGND	±10.1 V max
Crosstalk	Adjacent channels, DC to 10 kHz	–75 dB
Input coupling		DC
Sampling rate	Internal pacer	0.016 S/s to 100 kS/s, software-selectable
	External pacer	100 kS/s max
Sample clock source		▪ Internal A/D clock ▪ Pacer input terminal AICKI
Channel queue		Up to eight unique, ascending channels
Throughput	Software paced	33 to 4000 S/s typ, system dependent
	Hardware paced	100 kS/s max, system dependent
Warm-up time		15 minutes min

Accuracy

Analog input DC voltage measurement accuracy

Table 2. DC Accuracy components and specifications. All values are (±)

Range	Gain error (% of reading)	Offset error (mV)	Absolute accuracy at Full Scale (mV)	Gain temperature coefficient (% reading/°C)	Offset temperature coefficient (mV/°C)
±10V	0.098	11	20.8	0.016	0.87

Noise performance

For the peak to peak noise distribution test, the input channel is connected to AGND at the input terminal block, and 12,000 samples are acquired at the maximum throughput.

Table 3. Noise performance specifications

Range	Counts	LSBrms
±10 V	5	0.76

Analog input calibration

Table 4. Analog input calibration specifications

Parameter	Specification
Recommended warm-up time	15 minutes min
Calibration method	Factory
Calibration interval	1 year

Digital input/output

Table 5. Digital input specifications

Parameter	Specification
Digital type	TTL
Number of I/O	8
Configuration	Each bit may be configured as input (power on default) or output
Pull-up configuration	The port has 47 kΩ resistors that may be configured as pull-up or pull-down with an internal jumper. The factory configuration is pull-down.
Digital I/O transfer rate (system-paced)	33 to 4000 port reads/writes per second typical, system dependent
Input low voltage threshold	0.8 V max
Input high voltage threshold	2.0 V min
Input voltage limits	5.5 V absolute max –0.5 V absolute min 0 V recommended min
Output high voltage	4.4 V min (IOH = –50 µA) 3.76 V min (IOH = –24 mA)
Output low voltage	0.1 V max (IOL = 50 µA) 0.44 V max (IOL = 24 mA)
Output current	±24 mA max

External digital trigger

Table 6. External digital trigger specifications

Parameter	Specification
Trigger source	TRIG input
Trigger mode	Software configurable for edge or level sensitive, rising or falling edge, high or low level. Power on default is edge sensitive, rising edge.
Trigger latency	1 µs + 1 pacer clock cycle max
Trigger pulse width	125 ns min
Input type	Schmitt trigger, 47 kΩ pull-down to ground
Schmitt trigger hysteresis	1.01 V typ 0.6 V min 1.5 V max
Input high voltage threshold	2.43 V typ 1.9 V min 3.1 V max
Input low voltage threshold	1.42 V typ 1.0 V min 2.0 V max
Input voltage limits	5.5 V absolute max –0.5 V absolute min 0 V recommended min

External pacer input/output

Table 7. External pacer I/O specifications

Parameter	Specification
Terminal names	AICKI, AICKO
Terminal types	AICKI: Input, active on rising edge AICKO: Output, power on default is 0 V, active on rising edge
Terminal descriptions	AICKI: Receives pacer clock from external source AICKO: Outputs internal pacer clock
Input clock rate	100 kHz max
Clock pulse width	AICKI: 400 ns min AICKO: 400 ns min
Input type	Schmitt trigger, 47 kΩ pull-down to ground
Schmitt trigger hysteresis	1.01 V typ 0.6 V min 1.5 V max
Input high voltage	2.43 V typ 1.9 V min 3.1 V max
Input low voltage	1.42 V typ 1.0 V min 2.0 V max
Input voltage limits	5.5V absolute max -0.5V absolute min 0V recommended min
Output high voltage	4.4 V min (IOH = –50 µA) 3.80 V min (IOH = –8 mA)
Output low voltage	0.1 V max (IOL = 50 µA) 0.44 V max (IOL = 8 mA)
Output current	±8 mA max

Counter

Table 8. CTR specifications

Parameter	Specification
Pin name	CTR
Number of channels	1 channel
Resolution	32-bit
Counter type	Event counter
Input type	Schmitt trigger, 47 kΩ pull-down to ground
Counter read/write rates (software paced)	33 to 4,000 reads/writes per second typ, system dependent
Schmitt trigger hysteresis	1.01 V typ 0.6 V min 1.5 V max
Input high voltage threshold	2.43 V typ 1.9 V min 3.1 V max
Input low voltage threshold	1.42 V typ 1.0 V min 2.0 V max
Input voltage limits	5.5V absolute max –0.5V absolute min 0V recommended min
Input frequency	1 MHz max
High pulse width	*25 ns min*
Low pulse width	*25 ns min*

Memory

Table 9. Memory specifications

Parameter	Specification
Data FIFO	12 K (12,288) analog input samples
Non-volatile memory	2 KB (768 B calibration storage, 256 B UL user data, 1 KB DAQFlex user data)

Power

Table 10. Power specifications

Parameter	Conditions	Specification
Supply current	Typical (Note 1)	150 mA
	Maximum (including user voltage, DIO and AICKO loading)	500 mA
User voltage output terminal (+VO)		4.25 V min, 5.25 V max
User voltage output current		100 mA max

Note 1: This is the total quiescent current requirement for the device which includes up to 10 mA for the Status LED. This value does not include any potential loading of the digital I/O bits, AICKO, or user voltage.

USB specifications

Table 11. USB specifications

Parameter	Specification
USB device type	USB 2.0 (full-speed)
Device compatibility	USB 1.1, USB 2.0
USB cable type	A-B cable, UL type AWM 2725 or equivalent. (minimum 24 AWG VBUS/GND, minimum 28 AWG D+/D–)
USB cable length	3 m (9.84 ft) max

Environmental

Table 12. Environmental specifications

Parameter	Specification
Operating temperature range	0 °C to 55 °C max
Storage temperature range	–40 °C to 85 °C max
Humidity	0% to 90% non-condensing max

Mechanical

Table 13. Mechanical specifications

Parameter	Specification
Dimensions (L × W × H)	117.86 × 82.80 × 28.96 mm (4.64 × 3.26 × 1.14 in.) max

Screw terminal connector

Table 14. Screw terminal connector specifications

Parameter	Specification
Connector type	Screw terminal
Wire gauge range	16 AWG to 30 AWG

Table 15. Screw terminal pinout

Pin	Signal name	Pin description	Pin	Signal name	Pin description
1	GND	Digital ground	17	AGND	Analog ground
2	TRIG	Digital trigger input	18	CH7	Channel 7
3	CTR	Counter input	19	AGND	Analog ground
4	AICKI	External clock pacer input	20	CH6	Channel 6
5	AICKO	External clock pacer output	21	AGND	Analog ground
6	GND	Digital ground	22	CH5	Channel 5
7	+VO	User voltage output	23	AGND	Analog ground
8	GND	Digital ground	24	CH4	Channel 4
9	DIO7	DIO channel 7	25	AGND	Analog ground
10	DIO6	DIO channel 6	26	CH3	Channel 3
11	DIO5	DIO channel 5	27	AGND	Analog ground
12	DIO4	DIO channel 4	28	CH2	Channel 2
13	DIO3	DIO channel 3	29	AGND	Analog ground
14	DIO2	DIO channel 2	30	CH1	Channel 1
15	DIO1	DIO channel 1	31	AGND	Analog ground
16	DIO0	DIO channel 0	32	CH0	Channel 0

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